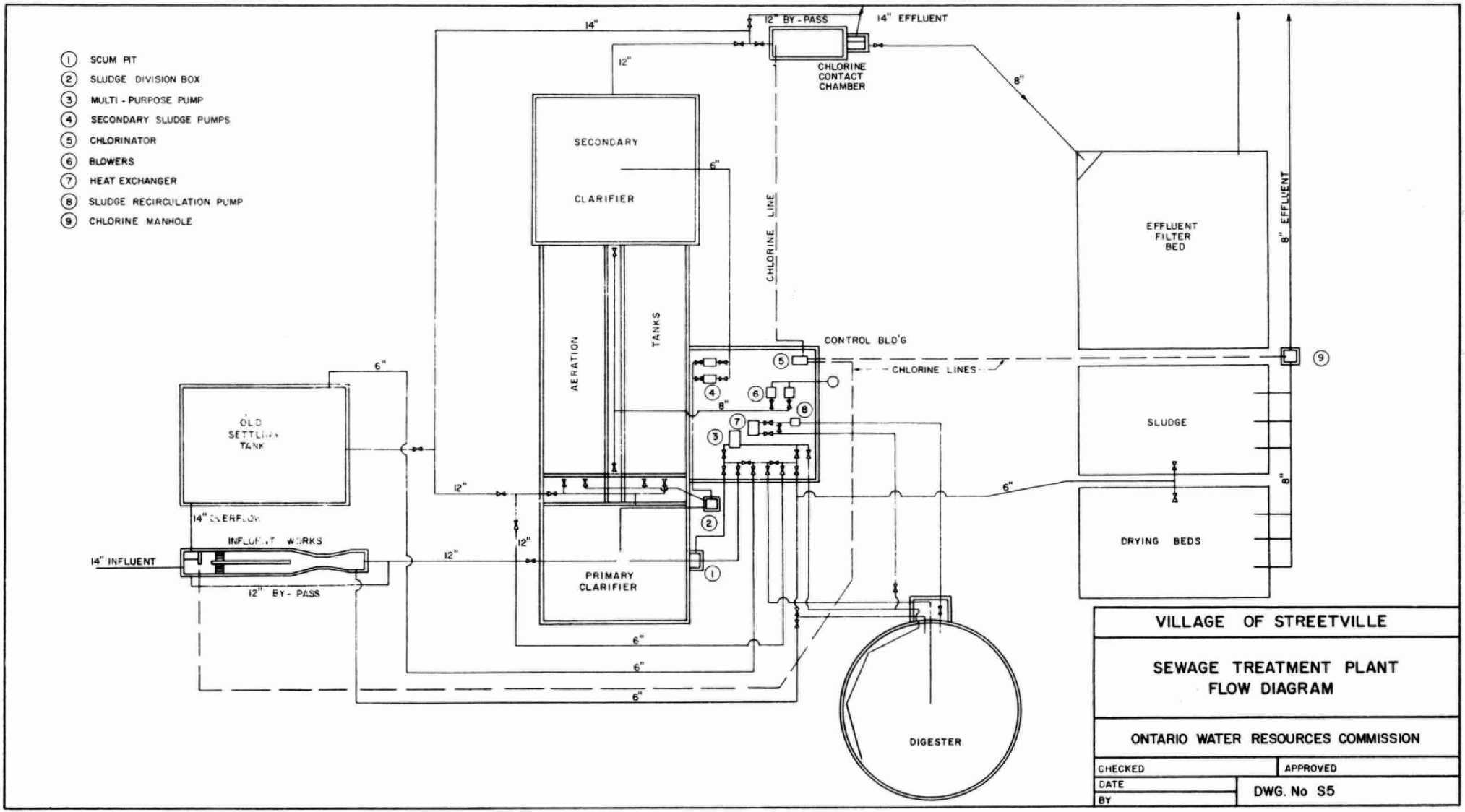
ANNUAL REPORT

1961

VILLAGE OF STREETSVILLE


1 SCUM PIT
2 SLUDGE DIVISION BOX
3 MULTI - PURPOSE PUMP
4 SECONDARY SLUDGE PUMPS
5 CHLORINATOR
6 BLOWERS
7 HEAT EXCHANGER
8 SLUDGE RECIRCULATION PUMP
9 CHLORINE MANHOLE
14" INFLUENT
14" OVERFLOW
12" BY - PASS
OLD SETTLING TANK
INFLUENT WORKS
PRIMARY CLARIFIER
AERATION TANKS
SECONDARY CLARIFIER
CHLORINE CONTACT CHAMBER
12" BY - PASS
14" EFFLUENT
CHLORINE LINE
CONTROL BLD'G
CHLORINE LINES
EFFLUENT FILTER BED
8" EFFLUENT
SLUDGE
DRYING BEDS
DIGESTER
VILLAGE OF STREETVILLE
SEWAGE TREATMENT PLANT
FLOW DIAGRAM
ONTARIO WATER RESOURCES COMMISSION
CHECKED
APPROVED
DATE
BY
DWG. No S5

A N N U A L R E P O R T

ON

VILLAGE OF STREETSVILLE

SEWAGE TREATMENT PLANT

OWRC PROJECT 57-S-5

STREETSVILLE SEWAGE TREATMENT PLANT

OPERATED FOR

THE VILLAGE OF STREETSVILLE

BY

THE ONTARIO WATER RESOURCES COMMISSION

Mr. A. M. Snider	-	Chairman
Dr. A. E. Berry	-	General Manager
Mr. D. S. Caverly	-	Assistant General Manager and Director of Plant Operations
Mr. B. C. Palmer	-	Assistant Director, Division of Plant Operations
Mr. P. M. Higgins	-	Project Engineer Division of Plant Operations

GENERAL

In January 1957, the Village Council of Streetsville made application to the OWRC for the construction of a $366,000.00 sewage treatment plant. Approval was given this project in May of the same year.

The plant was designed by the consulting engineering firm of Proctor and Redfern, and was constructed by Tret Construction Co. Ltd., under the supervision of the Construction Division of the OWRC.

The plant went into operation on October 28, 1958.

The population of Streetsville in 1958 was 4,400 persons. The plant was designed for 800,000 Imperial gallons/day, or a population design figure of approximately 180 gallons/capita/day. This allows for future growth in the town to a figure of approximately 8,000 persons. With the present residential development of 250 persons/year, it would appear that the plant will be adequate hydraulically for another 12 years.

PLANT DESCRIPTION

The present plant is an extension of the old Streetsville treatment facilities. Prior to 1958, the sewage treatment facilities consisted of a septic tank and sand effluent polishing bed. These units have been incorporated into the new plant, the septic tank being used as a storm overflow holding tank, with the sand filter bed providing some degree of treatment for excessive flows during heavy storms.

The present treatment plant is of the complete treatment, activated sludge type and includes influent works, primary clarifier, aeration tanks, secondary clarifier, chlorine contact chamber, digester, sludge drying beds, and the above mentioned

units of the old plant.

The sewage is collected by a system of separate sanitary sewers including four pump houses and enters the sewage treatment plant by gravity.

The raw sewage is introduced to the influent works of the plant through a 14" diameter cast iron main. The influent works consist of manually cleaned bar screens and grit channels. An overflow weir is provided in the influent works to provide for flows in excess of the plant's capacity.

The detention time in the grit channels is 0.42 minutes, reducing the velocity of raw sewage to such a point whereby all inorganic solids settle out. The sand removed is disposed of on plant property.

The bar screens remove twigs and rags etc., which would cause problems in the pumping equipment during the treatment process if not taken out at this point.

From the grit channels the sewage passes through a Parshall flume, whereby the total flow treated by the plant is measured. The flows are indicated and recorded on a weekly graph by an instrument in the plant building.

From the Parshall flume, the raw sewage flows into the primary clarifier. This is a tank 35' square and approximately 10' deep with a substantially flat bottom. It is provided with skimming mechanisms having a central inlet and peripheral overflow channels discharging to the aeration tanks.

The primary tank provides a retention period of 2.3 hours, a surface settling rate of 650 gallons/square foot of tank/day and a weir overflow of 6250 gallons/lineal foot of overflow weir/day.

The sludge, consisting of organic solids, collected in this tank is pumped to the digester, where in a controlled environment, it is reduced to a stable, odourless liquid.

There are two parallel aeration tanks in the plant. The primary clarifier effluent is mixed with activated sludge returned from the secondary tank and air is provided through tapered aeration, at the rate of 1.2 cubic feet/gallon. The volume in the two tanks is 40,800 cubic feet providing a retention period of 6.1 hours, with a return sludge figure of 25% of the total dry weather flow.

The aerated floc developed in this tank has high settleable qualities. The aeration section discharges to the final sedimentation tank where the largest percentage of settleable solids is removed.

Final sedimentation is provided for in a square tank, 40 feet square with a side wall depth of 10 feet. This provides a retention period of 2.4 hours, a surface settling rate of 625 gallons/square foot/day, with a weir overflow rate of 5,400 gallons/lineal foot of overflow weir/day.

The clear effluent passes over the V-notched weirs at the periphery of the tank and is collected in the outside launders. From the launders, it travels through 12" and 14" diameter cast iron pipes to the chlorine contact chamber.

Sludge scraper equipment collects the activated sludge (settled solids) on the tank bottom and returns it to the aeration section.

The Chlorine contact chamber provides a 20 minute detention period. Chlorination is carried out during the summer months, with a maximum dosage of 200 lbs./day.

The chlorinated final effluent, then flows to the

the plant.

The problems encountered in the operation of the plant during 1961 were of a relatively minor nature. All were solved either by the operator or with the assistance of the Head Office staff of the Plant Operations Division, of the OWRC. The maintenance section of the Plant Operations Division, of the OWRC spent 55 man hours at the plant during 1961, carrying out routine maintenance, none of which was charged to the project.

PLANT OPERATION

During the year 1961, the plant was operated by Mr. R. Dadd with the assistance of R. Jess, a part-time labourer. The plant was under 44 hours supervision per week, that is, 8 hours per day Monday through Friday, with 2 hours supervision on both Saturday and Sunday.

Mr. R. Jess was used around the plant for grass cutting, snow shovelling and cleaning duties.

Daily plant sampling was carried out, in order that treatment could be varied with the changing conditions of the raw sewage.

Composite samples were sent to the OWRC Laboratory for analysis, on a bi-weekly basis. Table I shows the efficiencies achieved by the plant during the year 1961.

The average reduction of 5 day BOD was 90.0%, and of suspended solids was 91.8%.

The plant treated 94.6 million gallons of sewage during 1961.

As part of the treatment of this 94.6 million gallons of sewage, approximately 799 cubic feet of grit were removed. This amounts to 8.4 cubic feet of grit/million gallons of sewage. This is quite high for a system supposedly made up of separate sanitary sewers. Normally grit removal is in the order of 1 - 2 cubic feet per million gallons.

One hundred and twenty-one cubic yards of dried sludge were removed from the sludge drying beds in 1961, at no cost to the project.

During the chlorination period from May 15th to September 29, 2144 lbs. of chlorine were use in the operation of

effluent filter bed, through the outfall to the receiving stream, the Credit River. The effluent filter bed is inoperable during the winter months.

Single stage digestion is provided at the plant. The digester is a cylindrical tank 45 feet in diameter with a 26' - 7½" side wall depth. This gives a digester capacity of 227,000 gallons or a storage of 4.5 cubic feet/capita.

The digested liquid sludge is run off to two drying beds, each having a surface area of 5,000 square feet. This gives a loading figure of 1.25 square feet/capita.

The dried sludge is cleaned from the beds and stock-piled on the plant site, where it is available to local residents as a soil conditioner.

1961 STREETSVILLE LAB RESULTS TABLE I

MONTH	RAW SEWAGE		PRIMARY EFFLUENT		FINAL EFFLUENT		%REDUCTIONS	
	BOD	SS	BOD	SS	BOD	SS		
January	335	331	263	143	18	23	94.6	93.0
February	332	345	217	143	10	36	97.0	89.6
March	192	247	141	133	11	25	94.3	90.0
April	165	188	115	110	14	24	91.5	87.2
May	255	220	150	108	5*	16*	98.1	92.6
June	165	258	107	111	3*	23*	98.2	91.0
July	120	146	70	116	6*	46*	95.0	68.6
August	240	1879	139	165	12*	63*	95.0	96.6
Sept.	254	322	129	123	4*	26*	98.4	91.8
October	570	500	260	200	21	44	96.2	91.2
November	318	307	260	211	12	31	96.1	90.6
December	245	182	245	252	14	40	94.2	78.0
Ave.	266	410	174	151	11	33	96.0	91.8

* chlorinated final effluent.

OPERATING COSTS

During 1961, the cost of operations at the Streetsville Sewage Treatment Plant was $12,627.33. This may be broken down as follows:

ITEM	AMOUNT	% OF TOTAL
Payroll	6,115.90	48.4
Fuel	800.94	6.3
Power	1,668.68	13.2
Chemical	1,105.52	8.8
General Supplies	563.16	4.5
Equipment	371.00	2.9
Repairs & Maintenance	132.58	1.0
Sundry	1,588.27	12.5
Water	281.28	2.4
TOTAL	12,627.33	100%

Table II shows the relationship between operating costs and quantity of sewage treated. It cost 13.4¢/1000 gallons to give secondary treatment to sewage at the Streetsville plant in 1961. Table III gives a comparison between operating costs of the Streetsville sewage treatment plant and plants of a similar size.

(see Table II)

TABLE II STREETSVILLE FLOW RECORDS 1961

All flows in million gallons/day.

MONTH	TOTAL FLOW	CUMULATIVE FLOW	MONTHLY OPERATING COST	COST PER MILLION GALS.
January	5.972	5.972	$ 541.50	$ 91.00
February	7.389	13.361	926.12	125.32
March	11.348	24.709	876.12	77.25
April	7.815	32.524	722.19	92.35
May	8.955	41.479	730.76	81.65
June	8.085	49.564	964.86	110.00
July	6.411	55.975	1288.37	200.00
August	6.447	62.422	1136.16	176.00
September	6.244	68.666	1396.80	221.00
October	6.545	75.211	1139.85	189.00
November	7.762	82.973	1189.86	236.00
December	11.884	94.560	1014.74	87.75

TOTAL Yearly Flow - 94.56

COST per million gallons $ 133.50.

TABLE III

PLANT	Design Capacity MGD	Av. Daily Flow MGD.	Flow Treated MG	Operating Cost	Cost Per MG
Burlington Elizabeth Gdns.	.75	.47	172.7	$22,091.39	127.80
Fergus	.6	.32	111.5	12,014.79	107.80
Streetsville	.8	.26	94.6	12,627.33	133.50

It may be seen from Table III, that as the flow approaches the design flow of the plant, that the cost of treating one million gallons of sewage is reduced. It can be expected therefore as the flows to the Streetsville Sewage Treatment Plant increase, the cost per million gallons will decrease.

The forecast of operating costs for 1962 is:

Payroll	5,800.00
Fuel	800.00
Power	1,800.00
Chemical	1,200.00
Equipment	600.00
General Supplies	300.00
Repairs and Maintenance	200.00
Sundry	400.00
Water	300.00
Contingency	1,600.00
TOTAL	$ 13,000.00

The following is a summary of costs incurred by the project in 1961 and a forecast for 1962.

	1961	1962
Operating	12,627.33	13,000.00
Debt. Retirement	5,619.00	5,669.00
Reserve	2,457.00	2,495.00
Interest	15,792.00	15,909.00
TOTAL	$ 36,495.33	$ 37,073.00

RECOMMENDATIONS AND SUMMARY

1. The grit channels should be modified to include a drain. This would facilitate the cleaning of the channels, as one channel could be drained dry for cleaning while the other carried all the plant flow. The present arrangement of cleaning while full of sewage allows for removal of a considerable percentage of organic.

2. The digester will require painting in 1962. This job can be done by the plant personnel.

Finally, the Streetsville Sewage Treatment Plant is providing efficient, economical treatment and is playing an integral part in abating pollution in the Credit River.